

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;

an ink supply port for supplying the ink from said ink chamber to the print head; and

a memory device formatted to store data indicative of the history of the ink cartridge, data indicative of past environment of use of the ink cartridge, and data indicative of past cleaning of the print head, said memory device having an area in which the data is stored in a rewritable manner.

2. (previously presented): An ink cartridge according to claim 1, wherein the data includes data related to the number of reproduction times of the ink cartridge.

3. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;

an ink supply port for supplying the ink from said ink chamber to the print head;

a memory device formatted to store data indicative of the history of the ink cartridge, said memory device having an area in which the data is stored in a rewritable manner; and

wherein the data includes data indicative of past maintenance processing required for use in a reproduction of the ink cartridge.

4. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;

an ink supply port for supplying the ink from said ink chamber to the print head;

a memory device formatted to store data indicative of the history of the ink cartridge, said memory device having an area in which the data is stored in a rewritable manner; and

wherein the data includes data indicative of past maintenance processing required for use in a reproduction of the ink cartridge;

wherein the data includes data indicative of a past condition of cleaning.

5. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;

an ink supply port for supplying the ink from said ink chamber to the print head;

a memory device formatted to store data indicative of the history of the ink cartridge, said memory device having an area in which the data is stored in a rewritable manner;

wherein the data includes data indicative of a maintenance processing required for use in a reproduction of the ink cartridge; and

wherein the data includes data indicative of a condition of exchange of a part of the ink cartridge.

6. (original): An ink cartridge according to claim 1, wherein the data includes data related to the time of final use of the ink cartridge.

7. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;

an ink supply port for supplying the ink from said ink chamber to the print head;

a memory device formatted to store data indicative of the history of the ink cartridge, said memory device having an area in which the data is stored in a rewritable manner;

wherein the data includes data indicative of the time of final ink depletion of the ink cartridge; and

wherein the data includes data indicative of past maintenance processing required for use in a reproduction of the ink cartridge..

8. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;
an ink supply port for supplying the ink from said ink chamber to the print head;
a memory device formatted to store data indicative of the history of the ink cartridge, said memory device has an area in which the data is stored in a rewritable manner; and
wherein the data includes data indicative of a past environment in which the ink cartridge was used.

9. (original): An ink cartridge according to claim 1, wherein said memory device stores data indicative of the date of manufacture of the ink cartridge.

10. (original): An ink cartridge according to claim 1, wherein said memory device stores data indicative of a lifetime of the ink cartridge.

11. (original): An ink cartridge according to claim 1, wherein said memory device stores data indicative of the time of final use of the ink cartridge.

12. (original): An ink cartridge according to claim 1, wherein said memory device stores data indicative of the number of reproductions of the ink cartridge which can be effected.

13. (previously presented): An ink cartridge for an ink jet type printing apparatus having a print head, the ink cartridge comprising:

a container having an ink chamber for containing ink therein;
an ink supply port for supplying the ink from said ink chamber to the print head; and
a memory device for storing data related to the ink or the ink cartridge, said memory device storing therein data relating to a minimum ink amount to be contained in the ink cartridge, said memory device having an area in which data indicative of a residual ink amount is stored in a rewritable manner;

wherein said ink cartridge is operable to alter an ink discharge operation during cleaning of the print head based on the stored data relating to the minimum ink amount and the residual ink amount.

14. (previously presented): An ink-jet printing apparatus comprising:
a print head for ejecting ink droplets;
an ink cartridge containing ink therein for supplying the ink to said print head;
a memory device storing data related to the ink cartridge, data related to past environment of use of the ink cartridge, and data related to past cleaning of the print head;
a control device accessible to said memory device for controlling said print head in accordance with data supplied from the exterior, said control device controlling a charging of the ink into said print head in accordance with data, stored in said memory device, when said ink cartridge is attached to the printing apparatus; and
said control device determines whether the print head needs cleaning and controls the cleaning operation.

15. (original): An ink-jet printing apparatus according to claim 14, wherein said control device judges from the data in said memory device whether or not the attached ink cartridge is a reproduced one.

16. (previously presented): An ink-jet printing apparatus according to claim 14, wherein the control of the ink charging operation is directed to the amount of ink drawn.

17. (original): An ink-jet printing apparatus according to claim 14, wherein said control device causes data, related to the conditions of use of said ink cartridge, to be stored in said memory device when said ink cartridge is to be detached from the printing apparatus.

18. (previously presented): An ink-jet printing apparatus according to claim 17, wherein said data, related to said conditions of use, is the time of ink depletion of said ink cartridge.

19. (original): An ink-jet printing apparatus according to claim 17, wherein said data, related to said conditions of use, is conditions of maintenance of said print head during the time when said ink cartridge is attached to the printing apparatus.

20. (original): An ink-jet printing apparatus according to claim 17, wherein said data, related to said conditions of use, is data related to an environment during the time when said ink cartridge is attached to the printing apparatus.

21. (previously presented): An ink-jet printing apparatus according to claim 14, wherein said control device judges from the data, stored in said memory device, whether or not a next reproduction of the ink cartridge is possible.

22. (previously presented): An ink-jet printing apparatus according to claim 14, wherein said control device judges whether or not the next reproduction of the ink cartridge is possible in accordance with the data stored in said memory device, and the control device displays an indication that the ink cartridge is to be discarded when it judges that the reproduction is impossible.

23. (previously presented): An ink-jet printing apparatus according to claim 21, wherein said judgment is made in accordance with the number of reproductions, a lifetime, a time period after detection of ink depletion, and an environment of use.

24. (previously presented): An ink-jet printing apparatus comprising:
a print head for ejecting ink droplets;
an ink cartridge containing ink therein for supplying the ink to said print head;

a memory device storing data representative of a preset minimum ink amount and residual ink in the ink cartridge; and

a control device accessible to said memory device for controlling said print head in accordance with data supplied from the exterior, said control device judging whether a cleaning operation is necessary in accordance with the data stored in said memory device.

25. (original): An ink-jet printing apparatus according to claim 24, wherein said control device executes the cleaning operation when the residual ink amount is greater than the sum of the preset minimum amount of ink and an amount of ink which is consumed by the cleaning operation.

26. (original): An ink-jet printing apparatus according to claim 24, wherein said control device executes a brief cleaning operation when the residual ink amount is the preset minimum ink amount but less than the sum of the preset minimum ink amount and an ink amount which is consumed by the cleaning operation.

27. (original): A cartridge reproducing device for an ink cartridge for an ink jet type printing apparatus having a print head, the reproducing device comprising:

means for reading data, related to a history of use of the ink cartridge to be reproduced, from a memory device provided on the ink cartridge;

a control device which controls a reproduction processing apparatus in accordance with said data, and causes at least data, representing the number of reproductions and the time of reproduction, to be stored in said memory device after the reproducing operation is finished; and said control device determines when and if the print head needs cleaning and controls the cleaning.

28. (original): A reproducing device according to claim 27, wherein said control device causes data, related to conditions of maintenance of the ink cartridge, to be stored in the memory device after the reproducing operation is finished.

29. (original): A reproducing device according to claim 27, wherein said reproduction processing apparatus includes at least a cartridge cleaning device, and an ink injecting device.

30. (original): A reproducing device according to claim 27, wherein said control device judges from the data in the memory device whether or not the reproduction is possible.

31. (previously presented): A reproducing device according to claim 27, wherein said control device controls the degree of cleaning by cleaning means in accordance with the data in said memory device.

32. (original): A reproducing device for an ink cartridge according to claim 27, wherein said control device effects a washing of the ink cartridge with ink to be reproduced in accordance with the data in the memory device.

33. (previously presented): An ink-jet printing apparatus comprising:
a print head for ejecting ink droplets;
an ink cartridge containing ink therein for supplying the ink to said print head;
a memory device storing data related to the ink cartridge, data related to environment of use of the ink cartridge, and data related to cleaning of the print head; and
a control device accessible to said memory device for controlling said print head in accordance with data supplied from the exterior, said control device judges, from the data stored in said memory device, whether the next reproduction of the ink cartridge is possible.

34. (original): An ink jet printing apparatus according to claim 33, wherein, wherein said control device causes data, related to the conditions of use of said ink cartridge, to be stored in said memory device when said ink cartridge is to be detached from the printing apparatus.

35. (previously presented): An ink-jet printing apparatus according to claim 14, wherein said control device judges whether a next reproduction of the ink cartridge is possible in accordance with the data stored in said memory device, and the control device displays that the ink cartridge is discarded if it judges that the reproduction is impossible.

36. (previously presented): A method of operating a printing ink cartridge reproducing device having a data memory device, a reproducing control device, an ink charging device and an ink discharge device, said method comprising:

- reading ink cartridge data from an ink cartridge having an ink memory circuit;
- evaluating the ink cartridge data using the reproducing control device;
- determining whether regeneration of the ink cartridge is possible; and
- recharging the ink cartridge using the ink charging device if the reproducing control device determines that regeneration of the ink cartridge is possible.

37. (previously presented): The method of operating a printing ink cartridge reproducing device of claim 36 wherein recharging the ink cartridge comprises:

- discharging residual ink from the ink cartridge using the ink discharge device;
- determining whether a part of the ink cartridge needs to be replaced using the reproducing control device;
- replacing the part of the ink cartridge that needs to be replaced;
- determining whether cleaning of the ink cartridge is needed by the reproducing control device;
- cleaning the ink cartridge if the reproducing control device determines that the ink cartridge needs to be cleaned;

determining whether the ink cartridge needs to be washed with ink using the reproducing control device; and

washing the ink cartridge if the reproducing control device determines that the ink cartridge needs to be washed with ink.

38. (previously presented): The method of operating a printing ink cartridge reproducing device of claim 37 wherein the reproducing control device uses data stored in the data memory device and data stored in the ink memory circuit.

39. (previously presented): The method of operating a printing ink cartridge reproducing device of claim 37 wherein the reproduction control device is within a printer.

40. (previously presented): The method of operating a printing ink cartridge reproducing device of claim 37 wherein the reproduction control device is within a computer.

41. (previously presented): The apparatus according to any one of claims 14 to 26 and 33 to 35, wherein the memory device is disposed on the ink cartridge.

42. (new): The cartridge reproducing device according to claim 27, wherein said memory device is provided on a circuit board containing electrical contacts for contacting with

said ink jet type printing apparatus, said memory device provided on a surface of said circuit board that is opposite to a surface containing said electrical contacts.

43. (new) The method of operating a printing ink cartridge reproducing device according to claim 36, wherein the reproducing control device reads the ink cartridge data from the ink memory circuit which is provided on a circuit board containing electrical contacts for contacting with a printing apparatus, the ink memory circuit provided on a surface of the circuit board that is opposite to a surface containing the electrical contacts.